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Brief

Docket 83630RLW
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

Jonathan K. Riek, et al.

METHOD AND APPARATUS FOR GENERATING IMAGE TRANSITIONS

Serial No. 09/998,622

Filed 31 October 2001

Group Art Unit: 2672

Examiner: Faranak Fouladi-Semnani

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August 25, 2004
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APPEAL BRIEF PURSUANT TO 37 C.F.R. 1.192

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APPELLANT'S BRIEF ON APPEAL

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of Claims 1-17 and 19-23, which was contained in the Office Action mailed April 6, 2004.

A timely Notice of Appeal was filed July 6, 2004.

Real Party In Interest

As indicated above in the caption of the Brief, the Eastman Kodak Company is the real party in interest.

Related Appeals And Interferences

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

Status Of The Claims

- [X] Claims 1-17 and 19-23 are pending in the application.
- [ ] Claims are cancelled.
- [ ] Claims stand allowed.
- [X] This appeal is directed to Claims 1-17 and 19-23 which all stand finally rejected by the Final Rejection dated April 6, 2004.

Appendix I provides a clean, double spaced copy of the claims on appeal.

Status Of Amendments

- [X] No amendments were filed subsequent to the Final Rejection.
- [ ] A first amendment was filed subsequent to the Final Rejection. This amendment was denied entry.
- [ ] A first amendment was filed subsequent to the Final Rejection and has been entered.

Summary Of The Invention

The invention relates to digital image processing, and particularly to a transition in a video bitstream sequence using a compression technique such as MPEG. In the MPEG example, there are three types of pictures: intra (I) pictures, predicted (P) pictures and bidirectionally-predicted (B) pictures. According to a

feature of the invention, transitions are between two anchor pictures are effected by inserting ONLY bidirectionally-predicted (B) pictures into the bitstream.

Issues For Review By The Board

The following issue is presented for review by the Board of Patent Appeals and Interferences:

Are Claims 1-17 and 19-23 anticipated by Jun et al (Proceedings of the Eigth ACM International Conference On Multimedia, published October 2000)?

Grouping Of Claims

In regards to patentability, unless otherwise indicated, the claims within each group stand or fall together. Reasons supporting the applicant's position that the claims in each group are separately patentable are provided in the Arguments section of this Brief in accordance with Rule 1.192(c)(7). The claims are grouped as follows:

A. Claims 1, 2, 10, 11 and 14-17
B. Claim 3
C. Claim 4
D. Claims 5 and 6
E. Claim 7
F. Claim 8
G. Claim 9
H. Claims 12 and 13
I. Claims 19-21
J. Claim 22
K. Claim 23

Arguments Relating to Claims 1, 2, and 10, 11 and 14-17

The Rejection of Claim 1

As to Claim 1, the Examiner refers to Section 3.1, 1st paragraph of Jun et al. on page 392 for its language:

"In order to select candidates for dissolve trasition in the compressed domain, we examine the spatio-temporal macro block type distribution of **each B-type frame** which is located right before or after anchor frame in display sequence."

"In Figure 2, **each selected frame** is B-type frame adjacent to an anchor frame."

"Note that **only B-type** frames which is adjacent to anchor frames are considered in this stage."

The emphasis in the quoted passages was the Examiner's. In response to the first Office Action, Appellants had argued that, while Claim 1 requires insertion of only bidirectionally-predicted (B) pictures into the bitstream, Jun et al. disclose a mixed sequence of types bidirectionally-predicted (B) and predicted (P) pictures. Responding specifically to Applicants' arguments, the Examiner refers only to the above quoted passages of Jun et al. without further explaination.

The Rejection of Claim 11

As to Claim 11, the Examiner refers to the 1st column of page 393 of Jun et al., last paragraph as disclosing a method where a sequence of type P pictures is used "*SpatDist(A)* is a spatial distribution measure of the macro blocks of type A. If A is Fwd, we calculate spatial distribution measure for forward predicted macro blocks and if the A is Bwd, calculate spatial distribution measure for backward predicted macro blocks."

In response to the first Office Action, Appellants had argued that, while Claim 11 requires coding a transition in the bitstream by inserting only predicted (P) pictures into the bitstream, Jun et al. disclose a mixed sequence of types bidirectionally-predicted (B) and predicted (P) pictures. Responding specifically to Applicants' arguments, the Examiner refers only to the above quoted passages of Jun et al. without further explaination.

Arguments for Patentability of Claims 1 and 11

Claims 1 and 11 require coding a transition in the bitstream by inserting only bidirectionally-predicted (B) pictures into the bitstream (required by Claim 1) or only predicted (P) pictures into the bitstream (required by Claim 11),

while Jun et al. discloses a mixed sequence of bidirectionally-predicted (B) and predicted (P) pictures.

To illustrate why it is argued that Jun et al. requires a mixed sequence of bidirectionally-predicted (B) and predicted (P) pictures, consider that Jun et al. discuss a technique to detect a dissolve transition encoded in an MPEG bitstream. In their Figure 1, Jun et al. show a typical Group of Picture (GOP) structure in display order of IBBBPBBBPBBBPBBBI. It is well known that the lowest allowed frame in MPEG-1 or MPEG-2 is 24 frames per second (fps). This is important in understanding Jun et al's disclosure because they state in the last sentence of the Abstract that "[t]he duration of dissolve transition is typically more than 0.3 second." Now, a disolve that takes more than 0.3 seconds at a minimum of 24 fps will extend over at least 8 frames. According to the GOP structure disclosed in Figure 1 (the only GOP structure disclosed by Jun et al.), this would require six bidirectionally-predicted (B) pictures and two predicted (P) pictures to encode the transition. Hence, Jun et al. do not disclose a method for inserting only bidirectionally-predicted (B) pictures to encode a transition. That is, Jun et al. require the inclusion of predicted (P) pictures as well.

While the passages of Jun et al. quoted by the Examiner refer only to bidirectionally-predicted (B) type frames, those passages do not mean (and do not state) that only bidirectionally-predicted (B) type frames are inserted into the bitstream to create the transition. The passages only imply that bidirectionally-predicted (B) type frames are being considered in those portions of the Jun et al. article.

The distinction is important. Jun et al. are showing that, for a dissolve transition, looking at the bidirectionally-predicted (B) pictures next to the anchor pictures, the ratio of forward predicted macro blocks to forward and backward predicted macro blocks will oscillate. In the present application, where there are no anchor pictures (e.g., I or P pictures) encoded in the transiton; there will be no oscillation.

Claims 2 and 10 depend from Claim 1 and are patentable therewith. Claims 14-17 depend from Claim 11 and are patentable therewith.

Arguments Relating to Claim 3

The Rejection of Claim 3

As to Claim 3, the Examiner refers to Section 3.1 (left column) of Jun et al. on page 393 without further comment.

Arguments for Patentability of Claim 3

Claim 3 depends from Claim 1 and is patentable therewith. Claim 3 further requires that the insertion of bidirectionally-predicted (B) pictures into the bitstream comprises switching a number of macroblocks in each of the bidirectionally-predicted (B) pictures from being forward predicted to being backward predicted.

The passage of Jun et al. relied upon by the Examiner demonstrates an example of spatio-temporal distribution of macro blocks in bidirectionally-predicted (B) pictures during a wipe transition. In the case of the Jun et al. disclosure, macro blocks are not being changed from forward predicted to backward predicted as set forth in Claim 3. Rather, most of the macro blocks are initially backward predicted and are changed to intra-coded, interpolated or forward predicted (see Figure 4). Some of the macro blocks are forward predicted, and change to backward predicted, intra-coded or interpolated; and then back again.

Arguments Relating to Claim 4

The Rejection of Claim 4

As to Claim 4, the Examiner refers to Jun et al. Section 3.1, right column, 2nd paragraph of pg. 392 through Section 3.2 on page 393 without further comment.

Arguments for Patentability of Claim 4

Claim 4 depends from Claim 3 and is patentable therewith. Claim 4 further requires that the insertion of bidirectionally-predicted (B) pictures into the bitstream comprises randomly switching a predetermined number of

macroblocks in each of the bidirectionally-predicted (B) pictures from being forward predicted to being backward predicted.

The passage of Jun et al. relied upon by the Examiner does not disclose changing a predetermined number of macro blocks from forward predicted to backward predicted. All that Jun et al. show is that, in a dissolve transition, the bidirectionally-predicted (B) pictures will generally be predicted from the nearest anchor picture. That is, if one has a sequence I_1, B_2, B_3, B_4, P_5, B_6, B7, B_8, P_9,..., then Jun et el. show that most of the macro blocks in B_2 will be predicted from I_1., most of the macro blocks in B_4 will be predicted from P_5, most of the macro blocks in B_6 will be predicted from P_5, most of the macro blocks in B_8 will be predicted from P_9, and so on.

Arguments Relating to Claims 5 and 6

The Rejection of Claim 5

As to Claim 5, the Examiner refers to the last paragraph of Jun et al. Section 3.1 on page 393 without further comment.

Arguments for Patentability of Claim 5

Claim 5 depends from Claim 1 and is patentable therewith. Claim 5 further requires that the first and second anchor pictures of Claim 1 correspond to the last anchor picture in a first video sequence and a first anchor picture in a second video sequence. In effect, this requires that there are only two anchor pictures contributing to a transition.

The passage of Jun et al. relied upon by the Examiner does not disclose that there are only two anchor pictures contributing to a transition as required by present Claim 5. Rather, the detection algorithm of Jun et al. will detect the transition [b,e] where b is the first anchor frame of the trasition and e is the last anchor frame of the transition. Referring to Figure 1 of Jun et al., there will be multiple anchor frames within the transition, not just one at each end as set forth in Claim 5.

Claim 6 depends from Claim 5 and is patentable therewith.

Arguments Relating to Claim 7

The Rejection of Claim 7

As to Claim 7, the Examiner refers to the last paragraph of Jun et al. Section 3.1 in the last paragraph, right column of page 393 without further comment.

Arguments for Patentability of Claim 7

Claim 7 depends from Claim 1 and is patentable therewith. Claim 7 further requires that the bidirectionally-predicted (B) pictures of Claim 1 comprise macroblocks that are forward predicted, backward predicted, or interpolated.

The passage of Jun et al. relied upon by the Examiner refers to macro blocks being forward predicted, backward predicted, interpolated or intra coded. Using the ratio of forward predicted macro blocks to forward and backward macro blocks, Jun et al. attempts to classify the entire picture as forward predicted, backward predicted or other. Jun et al. set forth nothing of not using intra-coded macro blocks.

Arguments Relating to Claim 8

The Rejection of Claim 8

As to Claim 8, the Examiner refers to the last paragraph of Jun et al. Section 3.1 in the last paragraph, right column of page 392 without further comment.

Arguments for Patentability of Claim 8

Claim 8 depends from Claim 7 and is patentable therewith. Claim 8 further requires that none of the macroblocks contain DCT coefficients.

The passage of Jun et al. relied upon by the Examiner does not discuss not using DCT coefficients. A forward predicted macro block may contain DCT coefficients to code the difference between the prediction and what the actual block should contain. For example, a forward predicted macro block in

a disolve-to-black will probably also contain a DC DCT coefficient to make the macro block darker than in the prior picture.

Arguments Relating to Claim 9

The Rejection of Claim 9

As to Claim 9, the Examiner refers to the last paragraph of Jun et al. Section 3.1 in the last paragraph, right column of page 392 without further comment.

Arguments for Patentability of Claim 9

Claim 9 depends from Claim 7 and is patentable therewith. Claim 9 further requires that each of the macroblocks contain motion vectors that are (0,0).

The passage of Jun et al. relied upon by the Examiner does not discuss motion vectors. Jun et al. merely compare the number of forward predicted macro blocks to backward predicted macro blocks.

Arguments Relating to Claims 12 and 13

The Rejection of Claim 12

As to Claim 12, the Examiner only refers to the rejection of Claims 1-10.

Arguments for Patentability of Claim 12

Claim 12 depends from Claim 11 and is patentable therewith. Claim 12 further requires that the first and second anchor pictures of Claim 11 correspond to the last anchor picture in a first video sequence and a first anchor picture in a second video sequence. In effect, this requires that there are only two anchor pictures contributing to a transition.

Jun et al. 5 do not disclose that there are only two anchor pictures contributing to a transition as required by present Claim 12. Rather, the detection algorithm of Jun et al. will detect the transition [b,e] where b is the first anchor frame of the trasition and e is the last anchor frame of the transition. Referring to

Figure 1 of Jun et al., there will be multiple anchor frames within the transition, not just one at each end as set forth in Claim 12.

Claim 13 depends from Claim 12 and are patentable therewith.

Arguments Relating to Claims 19-21

The Rejection of Claim 21

Claim 21 stands rejected by the Examiner "under the same rational" as claims 1 and 11, and also as disclosed in the last paragraph of the 2nd column on page 392. The Examiner states that Jun et al. "disclose in page 392 macro blocks predicted from the first anchor picture (forward type) or a previous inserted P picture and intracoded (I) macro blocks copied from the second anchor picture (backward type)."

Arguments for Patentability of Claim 21

Claim 21 requires copying intra-coded macro blocks from the second anchor picture into the inserted predicted (P) pictures. Nowhere is this disclosed in Jun et al.

Claims 19 and 20 depend from Claim 21 and are patentable therewith.

Arguments Relating to Claim 22

The Rejection of Claim 22

Claim 22 stands rejected by the Examiner "under the same rational" as claims 1 and 11, and also as disclosed in the last paragraph of the 2nd column on page 392. The Examiner states that Jun et al. "disclose in page 392 macro blocks predicted from the first anchor picture (forward type) or a previous inserted (P) picture and intracoded (I) macro blocks copied from the second anchor picture (backward type)."

Arguments for Patentability of Claim 22

Claim 22 requires that inserted bidirectionally-predicted (B) pictures comprise macroblocks that are forward predicted, backward predicted, or interpolated. The passage of Jun et al. earlier relied upon by the Examiner with

respect to Claim 7 refers to macro blocks being forward predicted, backward predicted, interpolated or intra coded. Using the ratio of forward predicted macro blocks to forward and backward macro blocks, Jun et al. attempts to classify the entire picture as forward predicted, backward predicted or other. Jun et al. set forth nothing of not using intra-coded macro blocks.

Arguments Relating to Claim 23

The Rejection of Claim 23

Claim 23 stands rejected by the Examiner on the grounds that applicant has admitted "that in MPEG similar to JPEG encoding, in a predicted macro block, a motion vector describes where in the previous anchor picture (I picture or P picture) to obtain the initial prediction of the current macro block."

Arguments for Patentability of Claim 23

Claim 23 depends from Claim 21 and is patentable therewith. Claim 23 further requires that the macroblocks of the predicted (P) pictures that are not intra coded contain motion vectors compresed of horizontal and vertical component that are integer multiples of 16. Jun et al. mentions nothing of encoding predicted (P) pictures with motion vectors that are integer multiples of 16.

Summary

It is believed that the references of record, taken singly or in combination, disclose the claimed invention.

Conclusion

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the rejection by the Examiner and mandate the allowance of Claims .

Respectfully submitted,

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Appendix I - Claims on Appeal

1. (Previously presented) A method for encoding a transition in ~~an~~ a video bitstream sequence including anchor pictures and bidirectionally predicted (B) pictures, said method comprising the steps of:

a) coding first and second anchor pictures; and

b) coding a transition in the bitstream by inserting only B pictures into the bitstream to create the transition from the first anchor picture to the second anchor picture.

2. (original) The method as claimed in claim 1 wherein the pictures are comprised of macroblocks and wherein the insertion of the B pictures into the bitstream to create the transition from the first anchor picture to the second anchor picture comprises starting with a B picture in which most of the macroblocks are predicted from the first anchor picture and ending with a B picture in which most of the macroblocks are predicted from the second anchor picture.

3. (original) The method as claimed in claim 1 wherein the pictures are comprised of macroblocks and wherein the insertion of the B pictures into the bitstream to create the transition from the first anchor picture to the second anchor picture comprises switching a number of macroblocks in each of the B pictures from being forward predicted to being backward predicted.

4. (original) The method as claimed in claim 3 wherein the insertion of the B pictures into the bitstream to create the transition from the first anchor picture to the second anchor picture comprises randomly switching a predetermined number of macroblocks in each of the B pictures from being forward predicted to being backward predicted.

5. (original) The method claimed in claim 1, where the first and second anchor pictures in step a) correspond to a last anchor picture in a first video sequence and a first anchor picture in a second video sequence.

6. (original) The method claimed in claim 5, where the video sequences comprise a group of still images.

7. (original) The method claimed in claim 1, where the B pictures in step b) comprise macroblocks that are forward predicted, backward predicted, or interpolated.

8. (original) The method claimed in claim 7, where none of the macroblocks contain DCT coefficients.

9. (original) The method claimed in claim 7, where each of the macroblocks contain motion vectors that are (0,0).

10. (Previously presented) A computer storage medium having instructions stored therein for causing a computer to perform the method of claim 1, wherein said method comprises the steps of:

a) coding first and second anchor pictures; and

b) coding a transition in the bitstream by inserting only B pictures into the bitstream to create the transition from the first anchor picture to the second anchor picture.

11. (Previously presented) A method for encoding a transition in a video bitstream sequence including anchor pictures and predicted (P) pictures, said method comprising the steps of:

a) coding a first anchor picture; and

b) coding a transition by inserting only P pictures into the bitstream to create the transition from the first anchor picture to a second anchor picture.

12. (original) The method claimed in claim 11, where the first and second anchor pictures correspond to a last anchor picture in a first video sequence and a first anchor picture in a second video sequence.

13. (original) The method claimed in claim 12, where the video sequences comprise a group of still images.

14. (original) The method claimed in claim 11, wherein the pictures are comprised of macroblocks that are either intra coded or predicted and wherein the second anchor picture is replaced with a P picture with the majority of the macroblocks replaced by macroblocks predicted from the previous P picture in the transition.

15. (original) The method claimed in claim 11, wherein the pictures are comprised of macroblocks that are either intra coded or predicted and where the inserted P pictures comprise macroblocks predicted from either the first anchor picture or a previous inserted P picture and intra coded macroblocks copied from the second anchor picture.

16. (original) The method claimed in claim 11, wherein the pictures are comprised of macroblocks that are either intra coded or predicted and wherein the predicted macroblocks contain motion vectors that are comprised of horizontal and vertical components that are integer multiples of 16.

17. (Previously presented) A computer storage medium having instructions stored therein for causing a computer to perform the method of claim 11, wherein said method comprises the steps of:

a) coding a first anchor picture; and

b) coding a transition by inserting P pictures into the bitstream to create the transition from the first anchor picture to a second anchor picture.

19. (Previously presented) The method claimed in claim 21, where the first and second anchor pictures correspond to a last anchor picture in a first video sequence and a first anchor picture in a second video sequence.

20. (original) The method claimed in claim 19, where the video sequences comprise a group of still images.

21. (Previously presented) A method for encoding a transition in a video bitstream sequence including anchor pictures, bidirectionally predicted (B) and predicted (P) pictures, said method comprising the steps of:

a) coding a first anchor picture; and

b) coding a transition by inserting B and P pictures into the bitstream to create the transition from the first anchor picture to a second anchor picture;

wherein the inserted P pictures comprise macroblocks predicted from either the first anchor picture or a previous inserted P picture and intra coded macroblocks copied from the second anchor picture.

22. (Previously presented) A method for encoding a transition in a video bitstream sequence including anchor pictures, bidirectionally predicted (B) and predicted (P) pictures, said method comprising the steps of:

a) coding a first anchor picture; and

b) coding a transition by inserting B and P pictures into the bitstream to create the transition from the first anchor picture to a second anchor picture;

wherein the inserted B pictures comprise macroblocks that are forward predicted, backward predicted, or interpolated.

23. (Previously presented) The method claimed in claim 21, wherein the macroblocks of the P pictures that are not intra coded contain motion vectors comprised of horizontal and vertical components that are integer multiples of 16.